

CLAIMS

1. A paging control method in a mobile network including:
 - a core network;
 - a radio access network including a plurality of base
 - 5 stations and a radio network controller serving as a paging control apparatus that includes two or more controllers that distribute communication between the core network and the base stations for each function and control the communication, one of the controllers processing a paging
 - 10 message transmitted from the core network to the radio access network; and
 - a mobile communication terminal that performs communication with the base station via a radio interface, the page control apparatus comprising:
 - 15 a first step of receiving the paging message transmitted from the core network to the radio access network; and
 - a second step of judging a transmission destination of the paging message and transmitting the paging message to
 - 20 the controller that controls a base station at the transmission destination.
2. The paging control method according to claim 1, wherein, at the second step, when the mobile communication
- 25 terminal is in a state in which connection is not established between the mobile communication terminal and the radio access network or the core network, the paging control apparatus judges that the controller that controls a predetermined base station or a base station specified
- 30 from the paging message is a transmission destination of the paging message.
3. The paging control method according to claim 2,

wherein, when there are a plurality of the base stations or the controllers, the paging control apparatus transmits the paging message according to multicast.

5 4. The paging control method according to claim 1,
 wherein, at the second step, when the mobile communication
 terminal is in a state in which connection is established
 between the mobile communication terminal and the radio
 access network or the core network, the paging control
10 apparatus judges that the controller that controls the
 connection is a transmission destination of the paging
 message.

5. A paging control apparatus that is in a mobile network
15 comprising:

 a core network;

 a radio access network including a plurality of base
 stations and a radio network controller that includes two
 or more controllers that distribute communication between
20 the core network and the base stations for each function
 and control the communication; and

 a mobile communication terminal that performs
 communication with the base station via a radio interface,
 the page controller being used as one of the
25 controllers constituting the radio network controller,
 wherein

 the paging control apparatus includes a processing
 unit for receiving a paging message transmitted from the
 core network to the radio access network and transmitting
30 the paging message to a predetermined mobile communication
 terminal.

6. The paging control apparatus according to claim 5,

further comprising a connection information registering unit that registers signal connection information including presence or absence of first connection between the mobile communication terminal and the radio access network,

5 presence or absence of second connection between the mobile communication terminal and the core network, and the controller that controls the first or the second connection, wherein

the processing unit specifies, when the paging message
10 is a paging message to a mobile communication terminal having the first or the second connection, a controller or a base station, which controls the connection, with reference to the signal connection information and transmits the paging message to the controller or the base
15 station.

7. The paging control apparatus according to claim 6, wherein

the signal connection information includes:
20 first connection information including the first connection, a first identifier that temporarily identifies the mobile communication terminal, and a first controller that controls the first connection; and

second connection information that associates, when
25 the mobile communication terminal sets the second connection, a second identifier having a number form peculiar to the mobile communication terminal with the first identifier, and

the processing unit specifies, when a paging message
30 is received from the core network, the first controller, which controls the first connection associated with the second identifier included in the paging message, with reference to the signal connection information and

transmits the paging message to the first controller.

8. The paging control apparatus according to claim 7, wherein

5 the second connection information further includes, when the core network notifies the mobile communication terminal of a third identifier having a number form peculiar to the core network, the third identifier associated with the first and the second identifiers, and
10 the processing unit specifies, when a paging message is received from the core network, the first controller, which controls the first connection associated with the third identifier included in the paging message, with reference to the signal connection information and
15 transmits the paging message to the first controller.

9. The paging control apparatus according to claim 6, wherein the processing unit transmits, when the paging message is a paging message to a mobile communication
20 terminal not having the connection, the paging message to a controller that controls a predetermined base station or a base station specified from the paging message.

10. The paging control apparatus according to claim 9, wherein the processing unit copies, when there are a
25 plurality of the controllers or the base stations specified, the paging message and transmits the paging message copied to all the controllers and the base stations.

30 11. The paging control apparatus according to claim 9, wherein the processing unit transmits, when there are a plurality of the controllers or the base stations specified, the paging message to the controllers or the base stations

according to multicast.

12. The paging control apparatus according to claim 9, wherein, when the controller further includes:

5 a second controller that controls a base station constituting a call area of the mobile communication terminal decided by the core network; and

 a third controller that controls data transfer to the base station controlled by the second controller,

10 the processing means transmits, when a paging message is received from the core network, the paging message to the second or the third controller using a multicast address of the second or the third controller associated with a call area registered in advance.

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13. A radio access network comprising:

 a plurality of base stations that performs communication with a mobile communication terminal via a radio interface; and

20 a radio network controller that is connected to a core network and includes two or more controllers that distributes communication between the core network and the base station for each function and controls the communication,

25 wherein at least one of the controllers is a paging control apparatus including a processing unit that processes a paging message transmitted from the core network to the radio access network.

30 14. The radio access network according to claim 13, wherein

 the paging control apparatus further includes a connection information registering unit that registers

signal connection information including presence or absence of first connection between the mobile communication terminal and the radio access network, presence or absence of second connection between the mobile communication terminal and the core network, and the controller that controls the first or the second connection, and

the processing unit specifies, when the paging message is a paging message to a mobile communication terminal having the first or the second connection, a controller, which controls the connection, with reference to the signal connection information and transmits the paging message to the controller.

15. The radio access network according to claim 14, wherein

the signal connection information includes:

first connection information including the first connection, a first identifier that temporarily identifies the mobile communication terminal, and a first controller that controls the first connection; and

second connection information that associates, when the mobile communication terminal sets the second connection, a second identifier having a number form peculiar to the mobile communication terminal with the first identifier, and

the processing unit of the paging control apparatus specifies, when a paging message is received from the core network, the first controller, which controls the first connection associated with the second identifier included in the paging message, with reference to the signal connection information and transmits the paging message to the first controller.

16. The radio access network according to claim 15,
wherein

the second connection information further includes,
when the core network notifies the mobile communication
5 terminal of a third identifier having a number form
peculiar to the core network, the third identifier
associated with the first and the second identifiers, and

the processing unit of the paging control apparatus
specifies, when a paging message is received from the core
10 network, the first controller, which controls the first
connection associated with the third identifier included in
the paging message, with reference to the signal connection
information and transmits the paging message to the first
controller.

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17. The radio access network according to claim 14,
wherein the processing unit of the paging control apparatus
transmits, when the paging message is a paging message to a
mobile communication terminal not having the connection,
20 the paging message to a controller that controls a
predetermined base station or a base station specified from
the paging message.

18. The radio access network according to claim 17,
25 wherein the processing unit of the paging control apparatus
copies, when there are a plurality of the controllers
specified, the paging message and transmits the paging
message copied to all the controllers or the base stations.

30 19. The radio access network according to claim 17,
wherein the processing unit of the paging control apparatus
transmits, when there are a plurality of the controllers
specified, the paging message to the controllers or the

base stations according to multicast.

20. The radio access network according to claim 17,
wherein

5 when the controller includes:

a second controller that controls a base station
constituting a call area of the mobile communication
terminal decided by the core network; and

a third controller that controls data transfer to the
10 base station controlled by the second controller,

the processing means of the paging control apparatus
transmits, when a paging message is received from the core
network, the paging message to the second or the third
controller using a multicast address of the second or the
15 third controller associated with a call area registered in
advance.

21. The radio access network according to claim 20,
wherein the second controller transmits, when the paging
20 message is received from the paging control apparatus, the
paging message to the third controller using a multicast
address of the third controller associated with the second
controller registered in advance.

25 22. The radio access network according to claim 21,
wherein the third controller transmits, when the paging
message is received from the second controller, the paging
message to the base station using a multicast address
including all base stations controlled by the third
30 controller registered in advance.

23. The radio access network according to claim 20,
wherein the third controller transmits, when the paging

message is received from the second controller, the paging message to the base station using a multicast address including all base stations controlled by the third controllers registered in advance.